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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/679,168	10/06/2003	Richard Scott Bourgeois	130026	3956
6147 7590 03/18/2008 GENERAL ELECTRIC COMPANY GLOBAL RESEARCH PATENT DOCKET RM. BLDG. K1-4A59 NISKAYUNA, NY 12309				
EXAMINER				
ECHELMEYER, ALIX ELIZABETH				
ART UNIT		PAPER NUMBER		
1795				
NOTIFICATION DATE		DELIVERY MODE		
03/18/2008		ELECTRONIC		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary

Application No.

10/679,168

Applicant(s)

BOURGEOIS ET AL.

Examiner

Alix Elizabeth Echelmeyer

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Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 January 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9, 11-14 and 17-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9, 11-14 and 17-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/S508)
- 4) ☐ Interview Summary (PTO-413)
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____
- Paper No(s)/Mail Date _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on January 7, 2008 has been entered.
2. Claims 1-9, 11-14 and 21 have been amended. Claims 10, 15 and 16 have been cancelled. Claims 1-9, 11-14 and 17-21 are pending and are rejected for the reasons given below.

Claim Interpretation

3. As stated in the MPEP, claims should be given their broadest reasonable interpretation (MPEP 2111). In the instant case, there is a disagreement over the interpretation of the claims (specifically, claims 1, 17 and 21). Applicant asserts that an interpretation that the stress inducer and interconnect of the claims cannot be interpreted as the same component. The examiner believes that, if a part can function as both, then the limitations of the claim are met.

The examiner also points out that, within a cell such as a cell found in Hsu, there is found both a set of electrolyte plates and a set of interconnect plates, and the

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electrolyte plates and interconnect plates alternate (Figure 1; column 11 lines 23-56).

For the purposes of examination, one of the interconnect plates can function as an "interconnect" and one can function as a "stress inducer", and the limitations of the claims are met.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-4, 6, 8, 9, 11, 14 and 17-21 are rejected under 35 U.S.C. 102(b) as being anticipated by Hsu (US Patent Number 4,721,556).

Hsu teaches an electrochemical converter using thin plates of solid oxide electrolyte and interconnects. The assembly of the stack is designed to ensure that the brittle electrolyte layers remain in compression during operation of the cell (abstract). For the purposes of examination, one of the interconnect plates can function as an "interconnect" and one can function as a "stress inducer", as discussed above.

The prestressed electrolyte plates are formed by heating the system, including the metal interconnect plates, to a temperature above the anticipated operating temperature of the system. The heating causes the plates to fuse together and the metal interconnect plates to expand, putting them in tension. When the assembly cools,

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the electrolyte plates experience in-plane compression due to the lower coefficient of thermal expansion (CTE) than the adjacent metal interconnects (column 3 lines 7-27; column 8 lines 14-33; Figure 7).

Regarding claims 1 and 21, Hsu teaches that compression is the favorable stress state for the ceramic electrolyte layers (column 3 lines 25-27). The metal interconnect plates induce stress on the ceramic layers.

As for claims 2 and 3, the electrolyte of Hsu experiences stress "in-plane" (column 3 lines 7-27). This is interpreted by the examiner to suggest that the stress is multi-axial, including a uniaxial as well as biaxial stress.

Regarding claims 4 and 6, the metal interconnect or stress inducer of Hsu is prestressed by heating during assembly of the stack. Since the metal interconnect is among several layers, it is attached to a layer other than the brittle layer on the other side of the plate than the interconnect layer.

Regarding claims 8 and 9, Hsu teaches that the CTE of both the electrolyte layer and the metal interconnect are known, and the CTE of the electrolyte layer is lower than that of the metal interconnect (Table I). With further regard to claim 16, the electrolyte layer and metal interconnect may be formed at 800°C, which is below the operating temperature of the fuel cell (column 3 line 18, column 6 lines 64-65).

As for claim 10, Hsu teaches that the cell is formed at a temperature higher than the operating temperature of the system, and that there is a mismatch of thermal expansion coefficients between the brittle layer and the metal layer, anticipating that the

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CTE of the electrolyte layer may be higher than the CTE of the metal layer (column 3 lines 7-27). As for claim 11, the first coating of the brittle layer can be applied to the metal interconnect prior to heating to a temperature that would cause significant expansion (Figure 5).

Claim 14 is drawn to the ratio between the thickness and width of the brittle layer. Although the width of the layer is not clearly defined by Hsu, the specification gives ranges for the thickness in Figure 6. As seen in Figure 1, the ratio of thickness to width of the brittle layer is far lower than 1.

Claims 17-20 are drawn to a method for fabricating the brittle layer of the fuel cell. Hsu teaches also the methods for making the cell described above (column 1 lines 11-14; column 3 lines 7-27; column 8 lines 17-33).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 5, 7, 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hsu in view of Bothwell (US Patent 4,276,331).

The teachings of Hsu as discussed above are incorporated herein.

Hsu teaches the prestressed reinforcement structure and brittle layer but fails to teach a wire-structure, fiber structure, wire-mesh structure, or perforated sheet structure embedded in the brittle layer.

Bothwell teaches a metal grid coated with a ceramic slurry. The plate is then heated, putting the metal in tension. When the assembly cools, the tension on the metal is relieved and the ceramic is under compressive stress (column 2 lines 21-50).

Bothwell further teaches that the present invention fulfills the need for low cost thermal insulating materials with good structural mechanical strength, resistance to severe cracking due to thermal cycling and ample physical strength to withstand deterioration or attrition from exposure to hot gases.

Hsu and Bothwell are analagous art since both deal with putting a ceramic plate into a state of compression. It is certainly within the ordinary skill of the art to look to another instance of a ceramic plate being put into a compressive state, as in Bothwell, since it would solve the same problem of preventing cracking of the ceramic plate.

It would have been advantageous to use the ceramic structure as taught by Bothwell in the cell taught by Hsu because the ceramic structure of Bothwell offers many advantages such as resistance to deterioration caused by exposure to hot gases as would occur in the operation of the cell of Hsu.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the ceramic structure of Bothwell in the cell of Hsu in order to increase the durability of the system.

Response to Arguments

8. Applicant's arguments filed January 7, 2008 have been fully considered but they are not persuasive.

First, Applicant argues that the stress inducer and interconnect are two separate physical elements. This argument has been addressed above, see "Claim Interpretation" section. Concerning claim 17, Applicant has asserted that Hsu does not teach a reinforcement structure. It is clear that the reinforcement structure is a different term for a stress inducer. This argument has been addressed concerning the stress inducer.

As for the arguments concerning the rejection over Hsu in view of Bothwell, Applicants state that the examiner has used hindsight reasoning. In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only

from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

Applicants also argue that the structure of Bothwell is made by a different method than that of the instant invention. Since the claims are drawn to a product, not a process, the method by which the product was made is not material. The structure of Bothwell and the instant invention is the same: a metal grid surrounded by ceramic.

In response to applicant's argument that Bothwell is nonanalogous art, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, Bothwell is reasonably pertinent to the particular problem since Bothwell teaches a metal-ceramic composite that provides good resistance to cracking.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alix Elizabeth Echelmeyer whose telephone number is (571)272-1101. The examiner can normally be reached on Mon-Fri 8-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Susy N. Tsang-Foster can be reached on 571-272-1293. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Susy N Tsang-Foster/
Supervisory Patent Examiner, Art Unit 1795

Alix Elizabeth Echelmeyer
Examiner
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aee